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IS 13636 (1993): Pliers and nippers for electronics - Technical supply conditions [PGD 5: Assembly Hand Tools]

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Indian Standard

PLIERS AND NIPPERS FOR ELECTRONICS — TECHNICAL SUPPLY CONDITIONS

UDC 621·881·4 [621·38] : 066·87

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

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Price Group 2

Assembly Hand Tools Sectional Committee, PE 05

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Assembly Hand Tools Sectional Committee had been approved by the Production Engineering Division Council.

This standard deals with the general requirements of the pliers and nippers of different varieties for exclusive use with the electronic gadgets.

For technical supply conditions for general purpose pliers, pincers and nippers, reference may be made to IS 2615 : 1989 'Pliers, pincers and nippers — Technical supply conditions (*second revision*)'.

These pliers and nippers for electronics are intended for use on electronic components, printed circuit boards, etc.

While preparing this standard, considerable assistance has been taken from the following standards:

ISO 9656 : 1989 Pliers and nippers for electronics general technical requirements; and
ISO 9657 : 1989 Pliers and nippers for electronics — Test methods;

issued by the International Organization for Standardization (ISO).

Indian Standard

PLIERS AND NIPPERS FOR ELECTRONICS — TECHNICAL SUPPLY CONDITIONS

1 SCOPE

1.1 This standard covers the technical supply conditions for pliers and nippers for electronics used manually for gripping and cutting while working on the electronic gadgets.

NOTE — This standard docs not apply to tools intended for working on live electrical circuits and antistatic applications.

2 REFERENCES

2.1 Following Indian Standards are necessary adjuncts to this standard:

IS No.	*Title*
2155 : 1982	Cold forged solid steel rivets for hot closing (6 to 16 mm diameter)
2500 (Part 1) : 1992	Sampling inspection procedures : Part 1 Attribute sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection (*second revision*)
2615 : 1989	Pliers, pincers and nippers — Technical supply conditions (*second revision*)
3749 : 1978	Tool and die steel for cold work (*first revision*)
4412 : 1981	Copper wires for general engineering purposes (*first revision*)
13610 : 1992	Electronic pliers and nippers — Nomenclature

3 NOMENCLATURE

3.1 For the purpose of this standard, the nomenclature as given in IS 13610 : 1992 shall apply.

4 SHAPE, SIZES AND DIMENSIONS

4.1 The shape, sizes and dimensions of pliers and nippers for electronics shall be as specified in the relevant Indian Standards. Shapes of handle, nose and gripping surfaces are recommended in IS 13610 : 1992.

5 MATERIALS

5.1 Pliers, Nippers and Rivets

5.1.1 Pliers, nippers and rivets shall be made from the suitable caron or alloy steels meeting the requirements of hardness and other tests as laid down in the respective Indian Standards.

Suitable Example :

Pliers and nippers	65T6, 70T3 and 75T6 conforming to IS 3749 : 1978
Rivets	Conforming to IS 2155 : 1982

5.2 Insulation

In the case of insulated tools, the insulating sleeve or insulation material used shall be of such a quality as to withstand the insulation tests specified in **8.5**. The test voltage shall not be indicated on the insulation or on the tool.

CAUTION

The fact that handles of pliers and nippers are insulated is no guarantee of immunity from electric shock. Although insulated tools may have withstood high voltages, damage due to subsequent dropping or the presence of liquid or perspiration may impair insulation. It is, therefore, recommended that complete reliance should not be placed on insulated handles.

6 HARDNESS

The hardness shall be as follows:

Body	350 to 510 *HV* (≈ 35 to 50 *HRC*)
Near cutting edges	510 to 700 *HV* (≈ 50 to 60 *HRC*)

NOTE — For testing the hardness requirements, refer IS 2615 : 1989.

7 WORKMANSHIP AND FINISH

7.1 Workmanship

7.1.1 The pliers and nippers shall be solid forged to shape. The rivets shall be interference fit in one of the arms and free fit in the other, and shall be finished flush with the surfaces. The jaws (gripping surfaces) and the cutting edges shall be properly hardened and tempered. The serrations in the jaws, if provided, shall be neatly cut to have a firm grip. In case of pliers having insulated handles, insulation shall cover the whole of the handle including the outer ends. The tool shall be free from burrs, scales and non-functional sharp edges and shall have a protective surface treatment. Typical surface finishes or treatments are as given in **7.2**.

7.1.2 *Handles*

Handles shall be shaped to afford a comfortable grip and shall prevent accidental pinching of the hand.

7.1.3 *Joints*

The joints shall be made to allow a free movement from the closed to open position within the normal working range and shall be free from excessive side movement which may impair its function.

7.2 Finish

Both the handles and the tool shall have one of the following finishes:

a) Smooth finished,
b) Black oxide finished,
c) Phosphate coated,
d) Laquered,
e) Electroplated, or
f) Plastic coated or with plastic sleeves which are meant for gripping comfort only.

8 TESTS

8.1 Wire Cutting Test

8.1.1 *General*

Cutting nippers for electronics shall cut copper wire conforming to IS 4412 : 1981. The range of diameters of the test wire shall be as given in the relevant standards of cutting nippers. After the completion of the test, the cutting edges shall not show visible identation or distortion which may affect the cutting performance of the tool.

8.1.2 *Diagonal and Oblique Cutting Nippers*

Place a straight length of the minimum diameter test wire on a hard, flat, horizontal surface. The wire shall be cut using the point of the jaws with the cutting edge vertical solely by applying manual force on the handles. Again place a maximum length of 25 mm of minimum diameter test wire at any position along the top two-thirds of the cutting edges, measured from the point. The wire shall be cut solely by application of manual force on the handles. These nippers shall cut the test wire at any position along the cutting edges. After the completion of test, the cutting edges shall not show visible indentation or distortion which shall affect the cutting performance of the test.

8.1.3 *Other Cutting Nippers*

Place a maximum length of 25 mm of minimum diameter test wire at any position along the cutting edges. The wire shall be cut solely by applying manual force on handles. The same requirements also apply when using the maximum diameter test wire. Here also the manual force shall be applied while cutting the wire. On completion of the test, the cutting edges shall not show any distortion or indentation on the cutting edges.

8.2 Shock Test

The pliers and nippers for electronis shall be capable of withstanding, without any sign of damage, the test of having the nose struck with normal manual force against a mild steel block while being held manually by the handles.

8.3 Torsion Test (For Round Nose Pliers)

The tool to be tested shall be placed in test block shown in Fig. 1. Insert the point of the jaws into a suitable test block as specified in **8.3.1**. With the jaws clamped in the test block, and the handles clamped to resist the turning moment, apply sufficient torque, first in clockwise direction and then in anticlockwise direction, to rotate the jaws relative to the handles through an angle $\alpha°$ as specified in Table 1. After completion of test, the points shall not show any angular misalignment and the tool shall not be damaged to affect its further use.

Table 1 Torsion Test Requirements for Round Nose Pliers

(*Clause* 8.3)

Length of Jaws	Nominal of Size Plier L	Angular Movement $\alpha°$
Short Jaws	112	20°
	125	
Long Jaws	125	25°
	140	

8.3.1 *Test Block for Torsion Test*

For round nose pliers, the test block shall be 3 mm thick, 12 mm wide and shall have a hardness between 40 to 45 *HRC*. The jaws shall be inserted into two 90° V-notches in test block such that the points of jaws are 3 mm apart and the jaws are clamped over a length of 2 mm from the point (*see* Fig. 1).

8.4 Load Test (Flat Nose and Snipe Nose Pliers)

8.4.1 *Test Piece*

Pliers shall grip a 3 mm thick test piece over a length of 2 mm measured from the point (*see* Fig. 2). The hardness of the test piece shall be between 30 *HRC* and 40 *HRC*.

8.4.2 *Procedure*

Apply the load F_1 (*see* Fig. 2), calculated using the formulae given in Tables 2 and 3, appropriate to the type of pliers under test. Upon completion of the test, the tool shall show no damage that could affect its further use.

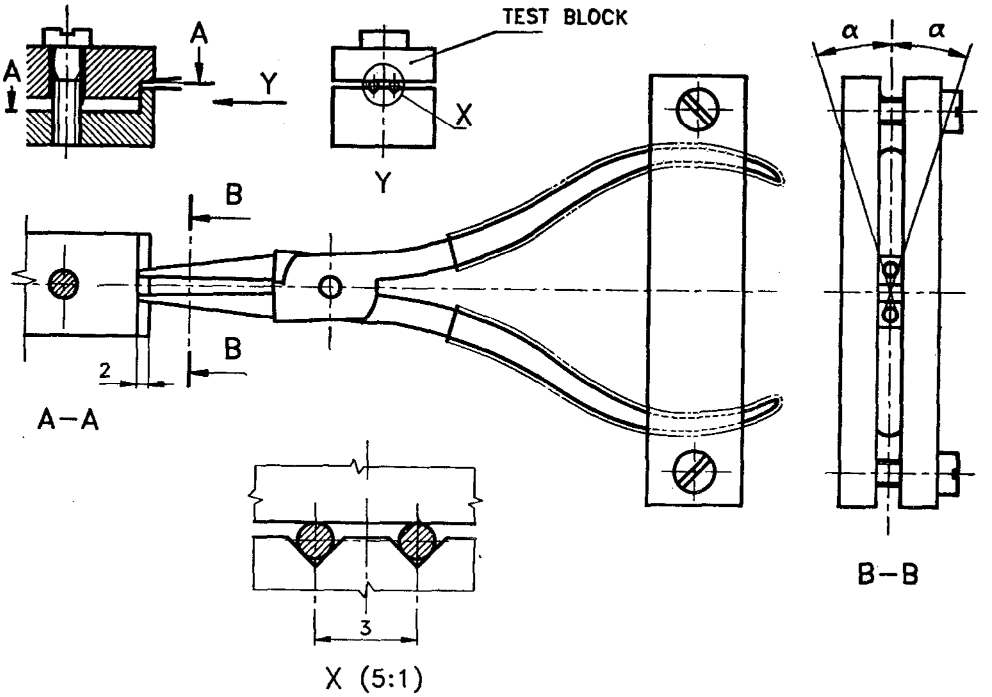
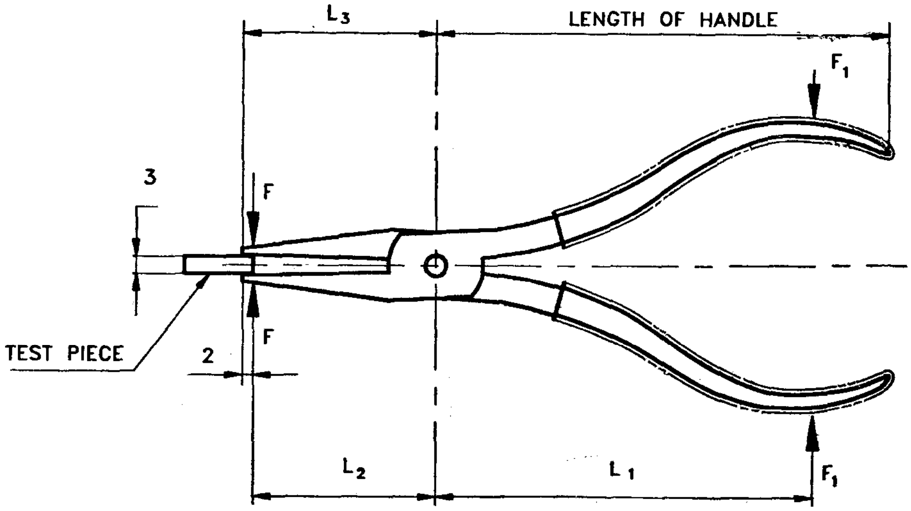


Fig. 1 Torsion Test For Round Nose Pliers



NOTES

1 L_3 is the length from the point of the jaws to the centre of the joint rivet. The test piece shall not be allowed to slip from the jaws.

2 L_1 is equal to 0·8 times the length of the handle.

Fig. 2 Load Test for Flat Nose and Snipe Nose Pliers

Table 2 Load Test Requirements for Flat Nose Pliers

(*Clause* 8.4.2)

Length of Jaws	Load Test		
	L mm	F N	F_1
Short Jaws	112 125	500	$F_1 = \frac{F \times L_2}{L_1}$
Long Jaws	125 140	400	

Table 3 Load Test Requirements for Snipe Nose Pliers

(*Clause* 8.4.2)

Length of Jaws	Load Test		
	L mm	F N	F_1
Short Jaws	112 125	400	$F_1 = \frac{F \times L_2}{L_1}$
Long Jaws	125 140	250	

8.5 Insulation Test

The insulated handles shall be immersed in a conducting fluid, that is, a solution of washing soda in water. Immersion shall be up to a distance from the end of the insulant sufficient to obviate any arcing between the solution and the head of the tool. The solution shall form one pole of an electric circuit, the opposite pole being formed by the jaws of the tool. The insulation shall then withstand a pressure of 2 800 volts (RMS) AC or 4 000 volts DC. The pressure shall be maintained continuously for two minutes during which time, there shall be no breakdown of the insulation.

9 DESIGNATION

9.1 Single Purpose and Multi-Purpose Pliers

For designating single purpose and multi-purpose pliers, the essential information shall be given in the following order in accordance with IS 13610 : 1992:

a) Shape of nose (end view at the point);
b) Shape of nose in the longitudinal direction;
c) With or without serrations;
d) With or without grooves;
e) Field of application (for example, size and type of wire, off-cut retention and sleeve requirements);
f) Type of joints;
g) Type of finish required;
h) Dimensions (nominal size); and
j) Number of relevant Indian Standard.

For multi-purpose pliers, the following additional information shall also be given:

a) Direction and position of cutting edges, and
b) Type and shape of cutting edges.

9.2 Nippers

For designating nippers, the essential information shall be given in the following order in accordance with IS 13610 : 1992:

a) Direction and position of cutting edges;
b) Type and shape of cutting edges;
c) Field of application (for example, size and type of wire, off-cut retention and sleeve requirements);
d) Type of joints;
e) Type of finish required;
f) Dimensions (nominal size); and
g) Number of relevant Indian Standard.

10 SAMPLING

10.1 In order to ascertain the conformity of the lot, the procedure for sampling inspection as given in IS 2500 (Part 1) : 1973 shall be followed. The inspection level and AQL for various characteristics shall be according to **10.2** and **10.3**.

10.2 For dimensions, workmanship and finish a single sampling plan with inspection level IV and AQL of 4 percent given in Table 1 and 2 of IS 2500 (Part 1) : 1973 shall be followed.

10.3 For hardness and other test requirements, a single sampling plan with inspection level II and AQL of 4 percent as given in Table 1 and 2 of IS 2500 (Part 1) : 1973 shall be followed.

11 PACKING

11.1 Each tool shall be wrapped in kraft or waxed paper and then suitably packed in cardboard carton bearing the designation and nominal size of the tool and the manufacturer's name, initials or trade-mark.

12 MARKING

The pliers and nippers shall be clearly and legibly stamped with the manufacturer's name, initial and/or recognized trade-mark and year of manufacture, if required by the purchaser.

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